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Perspectives

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Cloud Architecture Center What's new **Fundamentals** Content overview → Well-Architected Framework On this page 🗸 **Overview** Well-Architected Framework pillars and perspectives What's new **Pillars** Operational excellence

Security, privacy, and compliance Reliability

Cost optimization

Performance optimization Sustainability

Al and ML perspective View on one page Deployment archetypes

Landing zone design Enterprise foundations blueprint

Application development

Al and machine learning

Big data and analytics **Databases** V **Hybrid and multicloud**

Google Cloud Well-Architected Framework

Perspectives Core principles Design for change Document your architecture Simplify your design and use fully managed services

Decouple your architecture

To view all of the content in the Well-Architected Framework on a single page or to to get a PDF output of the content, see View on one page.

developers, administrators, and other cloud practitioners design and operate a cloud topology that's secure, efficient, resilient, high-performing, and cost-effective. A cross-functional team of experts at Google validates the recommendations in the Well-Architected Framework. The team curates the Well-Architected Framework to reflect the

expanding capabilities of Google Cloud, industry best practices, community knowledge,

The Well-Architected Framework provides recommendations to help architects,

and feedback from you. For a summary of the significant changes to the Well-

Architected Framework, see What's new. The Well-Architected Framework is relevant to applications built for the cloud and for workloads migrated from on-premises to Google Cloud, hybrid cloud deployments, and multi-cloud environments.

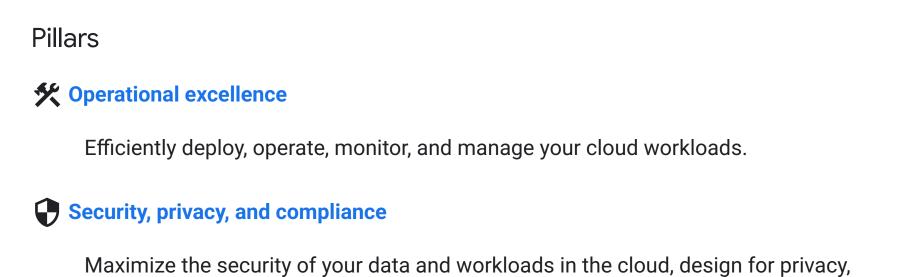
Well-Architected Framework pillars and perspectives The Well-Architected Framework is organized into five pillars, as shown in the following diagram. We also provide cross-pillar perspectives that focus on recommendations for

Operational Cost Performance privacy, and Reliability (technology, domain, industry) excellence optimization optimization compliance Example: AI and ML

Security,

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selected domains, industries, and technologies like AI and machine learning (ML).



and align with regulatory requirements and standards.

Performance optimization

A cross-pillar view of recommendations that are specific to AI and ML workloads.

Maximize the business value of your investment in Google Cloud.

Design and tune your cloud resources for optimal performance.

Design and operate resilient and highly available workloads in the cloud.

Core principles

changes.

profitability goals.

maintaining baseline systems.

systems incrementally over time.

Decouple your architecture

• Apply independent upgrades.

of your system upgrades as you scale.

Enforce specific security controls.

Perspectives

Q Al and ML

Reliability

Cost optimization

Design for change No system is static. The needs of its users, the goals of the team that builds the system,

and the system itself are constantly changing. With the need for change in mind, build a

changes and get fast feedback on those changes. Consistently demonstrating the ability

responsible for the system, and the users of the system. Using DORA's software delivery

metrics can help your team monitor the speed, ease, and safety of making changes to

development and production process that enables teams to regularly deliver small

to deploy changes helps to build trust with stakeholders, including the teams

Before you explore the recommendations in each pillar of the Well-Architected

Framework, review the following core principles:

the system. Document your architecture When you start to move your workloads to the cloud or build your applications, lack of documentation about the system can be a major obstacle. Documentation is especially important for correctly visualizing the architecture of your current deployments. Quality documentation isn't achieved by producing a specific amount of documentation,

but by how clear content is, how useful it is, and how it's maintained as the system

A properly documented cloud architecture establishes a common language and

in mind, to provide context for the design decisions.

standards, which enable cross-functional teams to communicate and collaborate

effectively. The documentation also provides the information that's necessary to identify

and guide future design decisions. Documentation should be written with your use cases

Over time, your design decisions will evolve and change. The change history provides the

context that your teams require to align initiatives, avoid duplication, and measure performance changes effectively over time. Change logs are particularly valuable when you onboard a new cloud architect who is not yet familiar with your current design, strategy, or history. Analysis by DORA has found a clear link between documentation quality and

organizational performance - the organization's ability to meet their performance and

Simplicity is crucial for design. If your architecture is too complex to understand, it will

be difficult to implement the design and manage it over time. Where feasible, use fully

workloads, then start simple, establish a minimal viable product (MVP), and resist the

urge to over-engineer. You can identify exceptional use cases, iterate, and improve your

managed services to minimize the risks, time, and effort associated with managing and

If you're already running your workloads in production, test with managed services to see how they might help to reduce operational complexities. If you're developing new

Simplify your design and use fully managed services

Research from DORA shows that architecture is an important predictor for achieving continuous delivery. Decoupling is a technique that's used to separate your applications and service components into smaller components that can operate independently. For example, you might separate a monolithic application stack into individual service components. In a loosely coupled architecture, an application can run its functions independently, regardless of the various dependencies. A decoupled architecture gives you increased flexibility to do the following:

 Monitor health. Granularly control performance and cost parameters.

You can start the decoupling process early in your design phase or incorporate it as part

Use a stateless architecture

Establish reliability goals for each subsystem.

progress and restart gracefully. Stateless applications can perform tasks without significant local dependencies by using shared storage or cached services. A stateless architecture enables your applications to scale up quickly with minimum boot dependencies. The applications can withstand hard restarts, have lower downtime, and provide better performance for end users.

A stateless architecture can increase both the reliability and scalability of your

Stateful applications rely on various dependencies to perform tasks, such as local

caching of data. Stateful applications often require additional mechanisms to capture

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